

American Potato Journal

Published Monthly by

The Potato Association of America

"Entered as second-class matter May 31, 1924, at the post office at Washington, D. C.,
under the Act of March 3, 1879."

SUBSCRIPTION PRICE \$1.00 PER YEAR

VOL. III. NO. 1

JANUARY, 1926

FERTILIZER PROSPECTS FOR 1926—THE USE OF CONCENTRATED MATERIALS IN POTATO FERTILIZATION

Jacob G. Lipman

There has been a marked tendency since the beginning of 1925 toward a rise in the cost of raw materials used for the making of mixed fertilizers. In the beginning of January 1925, nitrate of soda and sulphate of ammonia were quoted respectively at \$2.53 and \$2.75 per hundred pounds. The corresponding figures for the middle of December of same year were \$2.63 and \$2.95 respectively. A slight increase in the cost of available phosphoric acid has taken place and also some increase in the cost of the potash salts. For instance, at the beginning of January 1925, muriate of potash was quoted at \$24.55 per ton whereas about the middle of December of the same year the wholesale price quoted was \$34.90. It may be noted, therefore, that while the increase in the cost of nitrate of soda, sulphate of ammonia, acid phosphate and muriate of potash has not been large, there has, nevertheless, been a more or less marked increase. In the case of animal ammoniates, on the other hand, the increase has been a more substantial one. For instance, dried blood was quoted at the beginning of 1925 at \$3.60 per unit and tankage at \$3.40 per unit. The corresponding prices at the end of 1925 were \$4.00 and \$4.25 per unit respectively.

In considering the change in the wholesale prices of fertilizer materials, the prices reflected in the retail costs of plant-food, we find fluctuations during the course of the year. These fluctuations did not represent a wide range. The upward tendency might be ascribed to various factors which influence the cost of various commodities. In the case of fertilizer materials, the rate of exchange has no doubt been a factor of some importance. The stabilization of the German mark and the placing of the German currency on a gold basis has been partly responsible for the slight increase in

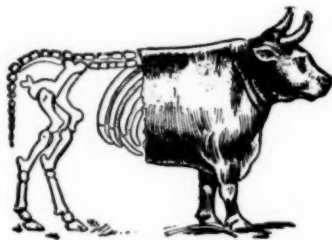
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the cost of potash as was already noted. In some degree this has been true also of the cost of nitrogen. We cannot overlook the fact that competitive factors in the world's markets influence the price of nitrate of soda, sulphate of ammonia and of other nitrogen fertilizers.

In making a study of the competitive factors, we are compelled at once to see that the manufacture of air fertilizers is playing a constantly more prominent role in determining the cost of nitrogen fertilizers in the world's markets. Among the European countries, Germany has forged to the front as the producer of so-called synthetic or air nitrogen fertilizers. Reliable information seems to indicate that the nitrogen fixation plants in Germany now have a capacity of about 600,000 tons of nitrogen per annum. This would be equivalent to 3,000,000 tons of sulphate of ammonia. Among the products made by the leading German manufacturing concerns, sulphate of ammonia heads the list. This is followed by a product known in the trade as Leuna salpeter, containing 26 per cent of nitrogen. The product next in importance is artificial nitrate of soda and this is followed by nitrate of lime which is guaranteed to contain $15\frac{1}{2}$ per cent of nitrogen or the same amount found in nitrate of soda imported from Chile. Also this is sold in very considerable quantities in Europe. Potash—ammonia—nitrate and urea are still other products now made on a commercial scale. In all of these the nitrogen is derived from the air and is manufactured into nitrogen compounds by various chemical or electrochemical processes.

In other European countries the manufacture of air nitrogen fertilizers is much less important. Nevertheless, in France, Italy, Switzerland, England and the Scandinavian countries there is a tendency to increase the output and to decrease the need for imported nitrogen fertilizers. In the United States the situation is influenced by the increasing output of by-product sulphate of ammonia. The present capacity is well above 600,000 tons. It is not at all unlikely that by 1930 the capacity of the by-product sulphate of ammonia plants in the United States will be equivalent to about 1,000,000 tons. It may be noted further that some development has occurred in this country in the construction of plants for the manufacture of nitrogen fertilizers from the air. Such plants exist at Niagara Falls, Syracuse, N. Y., and the Pacific Coast. Altogether then, we have a situation which is tending to decrease the cost of nitrogen fertilizers to farmers because of the keener competition which is developing. Germany is trying to find a market for the growing surplus of nitrogen fertilizers. It is beginning to compete in Japan and in the Dutch Indies with by-product sulphate of ammonia exported from the United States. This in turn reacts on the cost of domestic sulphate of ammonia. Altogether, therefore, the further development of the facilities for making ordinary air by-product nitrogen fertilizers will tend to keep down the cost of nitrogen in commercial fertilizers. At pres-

ent the materials brought to this country from Germany are competing with our own by-product sulphate of ammonia. Nitrate of soda has to follow the pace set by sulphate of ammonia and accordingly in spite of the higher costs of labor and materials there has been but a slight rise in the price of nitrogenous materials. The indications are that the prices in 1926 will be but slightly higher than those of 1925.

In the case of phosphoric acid, competition in the world's markets is felt here but indirectly. The American manufacturer of acid phosphate is not confronted by competition from the outside. However, our exports of phosphate rock to European countries have fallen off because of the development of the very extensive deposits of phosphates in northern Africa. This serves to create an abundance if not a surplus of phosphate rock for domestic use and discourages any substantial increase in the price of phosphoric acid. It may be noted further that the cost of brimstone now used almost extensively for the making of sulphuric acid, so important in the fertilizer industry, is a very moderate one and has been practically constant for a number of years. This, therefore, has a tendency to stabilize the price of available phosphoric acid.

All told, therefore, the improvements in the methods of manufacture of different raw materials used in the fertilizer trade, the more intense competition in the nitrogen market, the competition between the French and the German potash producers and the loss to our phosphate exporters of a part of their European trade have served to offset in a large measure the increasing cost of manufacturing and selling.

The fertilizer manufacturers realize more keenly than they ever did that transportation and labor costs must be kept at the minimum for the good of both agriculture and of the fertilizer industry. An effort is being made to offset the high transportation costs by manufacturing mixtures which would contain a greater quantity of available plantfood in a smaller bulk. A number of the leading fertilizer companies have accordingly placed on the market mixtures that are much more concentrated than those formerly in popular demand. For instance, one company is selling a new brand containing 4 per cent of ammonia, 12 per cent of available phosphoric acid and 4 per cent of potash, or a total of 20 units of plantfood. By way of experiment this company placed on the market about 5000 tons of this mixture. It evidently gave good results for in the following year there were sold of the same brand more than 40,000 tons. Other companies taking their cue from the success of this mixture have also placed similar brands on the market. Another brand put out by the same company in 1924 contained 5 per cent of ammonia, 15 per cent of available phosphoric acid and 5 per cent of potash, or a total of 25 units of plantfood. Still a third brand analyzes 4-16-4. A ton of this mixture is equivalent to 2 tons of a 2-8-2 formerly one of the most popular brands

in the east and middle west. In referring to these brands the President of the company states that:

"These grades are as concentrated as can be made with present available materials and with present plant equipment, and we feel that they are as concentrated as we should go for the time being, taking into consideration present practice and present distributing machinery. The controlling reason for making them is that we can deliver on the farm the very highest grade of plantfood at a less cost per unit to the farmer. So far it has not resulted in any decreased application, and in as much as we have not nearly reached the saturation point in fertilizer use we feel that it will not result in a decrease in tonnage; but will result in the farmer getting more plantfood under his crops."

Another of the leading fertilizer companies made its first attempt in 1924 to place concentrated mixed goods on the market. A relatively small quantity of this mixture was sold, largely by way of experiment. This mixture analyzed 6 per cent potash, or a total of 30 units of plantfood. In spite of the dry season, very good results were obtained from the nature which was used on cotton, tobacco, tomatoes, potatoes, corn, oats and a number of other crops. Naturally one might be inclined to raise the question whether a mixture containing 30 units of plantfood would be safe to use because of its concentration. In answer to this question a representative of the company says:

"So far as injury to the plants is concerned, we have had but one complaint from the many customers who used our goods last year. In fact, where concentrated fertilizers are used with any intelligence at all, there is no danger of burning the crop. In spite of the dry season we had the past year, no damage was noted to any of the crops by virtue of the fact that the goods were more concentrated than the ordinary goods. Some growers use as much as 800 pounds of concentrated fertilizer per acre which is equivalent to 1600 pounds of ordinary fertilizer."

Still another of the leading fertilizer companies is not manufacturing as yet the mixtures as concentrated as those referred to above. It seems, however, that also this company will place on the market before long mixtures that would compete from the standpoint of concentration and availability with those already made by other companies. The chemist of the company in question writes:

"Some years ago, you may recall, a 1-8-1 fertilizer was used extensively. That has practically disappeared now and for a number of years 2-8-2 was sold more than all other fertilizers put together. That is now being relegated to the past although a good deal of that brand is still sold. For cotton and tobacco 3-8-3 is still the popular brand, but 4-8-4, 3-10-3, 4-10-4 and 3-12-3 are being used to a greater and greater extent. Using the regular fertilizer materials, it is difficult to make a mixed fertilizer con-

taining more than about 20 per cent plantfood. When you go above that percentage you have to use largely mineral fertilizers and you have to go to so-called triplephosphate, that is acid phosphate containing from 40 to 45 per cent available phosphoric acid. Then too, sulphate of ammonia will have to be used very largely and muriate of potash almost exclusively. The triplephosphate is very much higher per unit than the 16 to 18 per cent acid phosphate. Muriate of potash usually costs appreciably more than manure salts per unit of potash, so by using those materials, the price per unit of plantfood is increased."

There is scarcely any need to quote further the opinions of leading manufacturers and their chemists as to the economic significance of more concentrated fertilizers. The manufacturers are being driven by the pressure of higher costs of labor and materials to produce goods that are more economical to handle and to transport. The somewhat higher cost of the concentrated raw materials is more than met by the savings accomplished in freights, bags and bagging, and selling.

In view of the above, it would not be out of place to mention here the type of the more concentrated raw materials that are available both to farmers and to manufacturers of mixed goods. Among the materials furnishing nitrogen or ammonia, mention should be made of Leuna salpeter, already referred to above. This product is manufactured in Germany and is being imported into this country. It contains 26 per cent of nitrogen which, is equivalent to about $31\frac{1}{2}$ per cent ammonia. Another nitrogen product made by the American Cyanid Company and known as Ammo-phos contains 13 per cent of ammonia and 48 per cent of phosphoric acid. The cost of this product is still too high to allow it to compete in the domestic markets. However, efforts to produce this on a commercial scale are being made in Germany and it is not at all unlikely that it may become a more or less important source of nitrogen in commercial fertilizer mixtures. Mention has already been made of so-called triplephosphate which contains 45 to 48 per cent of available phosphoric acid as against 16 per cent in the ordinary acid phosphate. These materials, together with muriate and sulphate of potash, make it possible for fertilizer manufacturers to prepare the concentrated mixtures already mentioned. It now remains to decide to what extent the materials thus used and the more concentrated mixtures themselves will fit into the plans of the potato grower.

In the first place, there is a growing belief among potato farmers that it pays to supply an abundance of available ammonia to the crop. Many growers who formerly considered 4 per cent of ammonia as entirely satisfactory for their purpose have of late years been calling for 5 rather than 4 per cent of ammonia in their mixtures. One of the popular brands is 5-8-5, although, in the southern part of the state, some of the growers will use mixtures containing

as high as 6 per cent of ammonia. There has also been a tendency to use a somewhat larger proportion of potash in potato mixtures, up to 7 or 8 per cent.

The brand which will best suit any particular grower must be determined by the condition of the soil as well as by the total amount of fertilizer used. There is scarcely any need to point out again at this time that a smaller amount of a more concentrated fertilizer mixture will render the same service as a larger amount of a less concentrated mixture. Hence, if concentrated mixtures are likely to be more economical when the cost of plantfood per unit is considered, there should naturally be a greater demand for the more concentrated mixtures provided other factors do not come in to make such concentrated mixtures less desirable. One of the factors that is worthy of mention in this connection has to do with the effect of the fertilizer on the seed and on the plants. By this time most potato growers know that excessive quantities of soluble salts applied in the row will exert a so-called "burning" effect. The nature of this burning has been discussed at previous meetings. It would be sufficient to state at this time that soluble salts produce a more concentrated solution in the soil at the place where they are applied. If these are applied next to the seed the soil moisture surrounding the seed will contain a concentrated solution of chemicals. Such concentrated solutions may interfere with germination or may cause damage to the roots. In view of this, some growers will naturally hesitate to use more concentrated fertilizers because of the damage that it might do. It would be a pity if this objection, which could be readily overcome, should induce the farmer to call for relatively more expensive but less concentrated mixtures. It has been shown by experiments conducted in New Jersey, Wisconsin and Iowa that very concentrated mixtures may be employed without damage to the crop. In some of the experiments at the New Jersey Station in 1925 mixtures containing 50 units of available plantfood were employed successfully. Such mixtures are practically twice as concentrated as those which were mentioned a while ago. The secret in the successful use of concentrated and soluble fertilizers lies in the placing of the material at a distance sufficiently great from the seed to avoid producing an excessive concentration of salts in the proximity of the seed piece. The suggestions that have come from the New Jersey Station have led to the organization of a national committee of twelve in which the National Fertilizer Association, the manufacturers of agricultural machinery, the Association of Agricultural Engineers and the American Society of Agronomy are equally represented. It is the duty of this committee to study the construction of fertilizer distributing machinery and to make recommendations that will lead the manufacturers to sell only such fertilizer distributors as would minimize the danger of fer-

tilizer burning. Within the past year or two much progress has been made in bringing to the attention of fertilizer manufacturers as well as of agricultural machinery manufacturers the need of sound methods of applying commercial fertilizer. Progressive potato growers have been much interested in the question. There is a tendency among them to apply the fertilizer on the same level with the seed and at a slight distance from it. Where the applications are large, let us say 2000 to 2500 pounds per acre, and especially where the soil is light in character, it might be well to use only a portion of the fertilizer at the time of planting the seed and to employ an additional quantity as a side dressing later on.

In a general way, it may therefore be said that the changes in the cost of fertilizer chemicals will be relatively slight when the prices of 1925 and 26 are compared. It is only in the case of the animal ammoniates that substantially higher costs of materials will be noted. Another general statement which would be justified at this time is that the manufacturers will be pushing the sale of more concentrated mixtures and that agricultural machinery manufacturers will improve the construction of their fertilizer distributors so as to minimize the danger of fertilizer burning. (Finally, it may be noted that the fertilizer used in New Jersey still contains a very considerable proportion of ammonia derived from animal sources. The goods sold in this state contain nearly $1\frac{1}{4}$ per cent of ammonia from animal sources in a total of about $3\frac{1}{2}$ per cent. A tabulation of 426 brands of mixed fertilizer sold in New Jersey in 1925 shows that these brands contain on the average 3.45 per cent of ammonia, 8.41 per cent of available phosphoric acid and 5.77 per cent of potash. This will compare very favorably with the mixtures sold in other states. In fact, potato growers in New Jersey are as well aware as any potato growers in the United States that high grade mixtures are more economical than low grade mixtures in the production of potatoes.)

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AMERICAN POTATO JOURNAL

PUBLISHED BY

THE POTATO ASSOCIATION OF AMERICA

WALTER M. PEACOCK, EDITOR & BUS. MGR.

108 BALTIMORE AVE., TAKOMA PARK, D. C.

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CHANGE IN NAME

American Potato Journal will come somewhat as a surprise to most of the readers of The Potato News Bulletin, but the editor is sure that it will be a pleasant surprise. We feel sure that you will like the change and agree that American Potato Journal is the better name. It is the same publication that you have enjoyed and profited by reading during the past two years. There will be no change except in name. There is room for improvement and the editor cordially invites your hearty cooperation as in the past. If you have a suggestion for the American Potato Journal please send it to the editor who will give it careful consideration. Last month Dr. Wm. H. Martin suggested that the contents be printed in each issue. This was a good suggestion and it has been adopted. It will be found in each issue on the editorial page. There are many ways which each individual reader can help namely, by sending articles, news items concerning the growing and marketing the crop, offering suggestions for improvement, selling advertising space, and securing new members. Every reader can secure new members with a little effort. Why not help your neighbors by getting them to become members of The Potato Association of America which entitles them to receive the American Potato Journal? When you help your neighbor to become a better potato grower you indirectly help yourself and the community in which you live. Your potatoes are known in the big markets by the kind your community or state produces.

The object of the American Potato Journal is to serve the potato industry in the best possible manner including the growing, transporting and marketing the crop.

The editor wishes again to emphasize that this is your publication and is going to be what you make it with the assistance of the officers and the editor.

CROP REPORTERS

Every reader of this publication is interested in learning about the crop in other sections. For this reason we are aiming to have better "Potato Notes Including Certification" than ever before. The men who are listed below have been appointed to report on the growing, storage and marketing the crop for their country, province or state. If you cannot serve kindly inform the editor and suggest another person who is well qualified.

- E. D. McSweeney, Rosemead, Los Angeles, (southern) Calif.
- Herbert Zuckerman, 409 Koerber Bldg., Berkeley, (northern) Calif.
- W. C. Edmundson, Greeley, Colo.
- B. A. Brown, Storrs Agr'l Expt. Station, Storrs, Conn.
- G. W. Waller, Hastings, Florida.
- Chas. W. Hungerford, College of Agr., Moscow, Idaho.
- O. C. Boyd, Thomasville, Georgia.
- K. P. Bemis, 192 No. Clark St., Chicago, Ill.
- E. R. Lancashire, Hort. Dept., Purdue Univ., La Fayette, Ind.
- C. L. Fitch, Iowa Exp. Station, Ames, Iowa.

E. A. Stokdyk, College of Agr., Manhattan, Kansas.
 John S. Gardner, Expt. Station, Lexington, Kentucky.
 G. L. Tiebout, Louisiana State Univ., Baton Rouge, La.
 E. L. Newdick, Dept. of Agr., Augusta, Maine.
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 F. M. Harrington, State College of Agr., Bozeman, Montana.
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 Dr. O. R. Butler, Durham, New Hampshire.
 Dr. Wm. H. Martin, Expt. Station, New Brunswick, N. J.
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 Worth G. Couey, Agr'l College, North Dakota.
 Earl Jones, Ohio State Univ., Columbus, Ohio.
 Ed. C. Dustin, Capitol Station, Oklahoma City, Okla.
 E. R. Jackman, Agr'l College, Corvallis, Oregon.
 R. E. Hartman, Hazleton, Pennsylvania.
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 Geo. L. Zundel, Agr'l College, Pullman, Washington.
 Dee Crane, Morgantown, West Virginia.
 J. W. Brann, College of Agr., Madison, Wisconsin.
 A. F. Vass, Univ. of Wyoming, Laramie, Wyoming.

Canada

C. Tice, Dept. of Agriculture, Victoria, British Columbia.
 Guy R. Bisby, Agr'l College, Winnipeg, Manitoba.
 O. C. Hicks, Dept. of Agr., Fredericton, New Brunswick.
 J. F. Hockey, Kentville, Nova Scotia.
 John Tucker, Ontario Agr'l College, Guelph, Ontario.
 S. G. Peppin, Expt. Farm, Charlottetown, Prince Edward Island.
 W. H. Tawse, MacDonald College, St. Anne de Bellevue, Quebec.
 J. W. Scannell, Univ. of Saskatchewan, Saskatoon, Sask.

England

Sutton & Sons, Reading, England.

Orange Free State

J. B. Lurie, Tweesprint, Orange Free State, South Africa.

Russia

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Scotland

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ANNUAL REPORT OF THE EDITOR AND BUSINESS MANAGER OF THE POTATO NEWS BULLETIN

The editor, with the able assistance of the other members of the editorial staff and members of the Potato Association of America has already reported twelve times this year. You have formed your opinion concerning The Potato News Bulletin and the editor is not going to attempt to persuade you to change your judgment. In the 516 pages that have been published, you have received practically what you have given. In other words, you have reaped

what you have sown. Nevertheless, your efforts have brought forth very favorable comments from a large number of leaders in the potato industry. Time will not permit to relate even a few of them.

The editor feels that there is still much room for development and improvement. Recently one of the associate editors suggested that a table of contents be published with each issue. Being an excellent suggestion it was printed in the December number. The editor has tried to impress the readers of The Potato News Bulletin that constructive criticisms or suggestions for improvement are solicited and our monthly publication is not published by one man or a group of a few men. The Potato News Bulletin will never reach its maximum development until the greatest possible number of its readers take an active interest.

As to the financial status of The Potato News Bulletin there were times when it seemed that the editor and business manager was constantly swimming against the current with The Potato News Bulletin on his back, but he managed at all times to keep on top. At one time it seemed impossible to be able to publish the October, November and December numbers from funds received from associate memberships, one-half of active memberships and receipts from advertisements. The potato machinery manufacturers curtailed their advertising this year because early in the season most of the potato growers did not have the cash for purchasing new equipment and most of the seed potato growers this fall were satisfied with the demand and prices for their stock without advertising in The Potato News Bulletin. However, with the able assistance of H. O. Werner, C. Tice, Worth G. Couey, H. C. Moore, J. W. Weston, E. V. Hardenburg, Daniel Dean, William H. Martin and many others The Potato News Bulletin is in a better financial standing than when it launched out on its own resources nearly a year ago.

It may be instructive to mention one instance of how several can help to finance The Potato News Bulletin. About a month ago the business manager appealed to Daniel Dean to help to sell advertising space. As usual, Mr. Dean brought home the bacon. He was influential in selling \$80.00 worth of advertising space and this is not the first time he has rendered similar service for the advancement of our publication. These are big helps and something that many can accomplish. Judging by personal experience in selling tractors and advertising space, selling cannot be done successfully by correspondence. Washington is so near the big fertilizer companies in the east that it would be a good investment to send the business manager to the offices of these companies to solicit advertisements. Personal contact is worth a dozen letters.

You will notice in the financial report on the next page that after paying all debts incurred to December 24, 1925, inclusive, there is a cash balance of \$9.99. Judging from previous experience, it is possible to continue in this manner, but the business man-

ager does not consider living from hand to mouth a good business practice. The financial status on December 24, 1925, is given in the following statement.

FINANCIAL STATEMENT OF THE POTATO NEWS BULLETIN

	Receipts.	Disburse- ments.
Division of the Potato Ass'n of America's account on Jan. 15, 1925	\$118.06	
One half of active membership dues after Jan. 15, 1925 from Potato Ass'n of America ..	432.50	
Dues from associate membership	460.50	
Receipts from advertisements	835.15	
Total receipts from Jan. 15, 1925 to December 24, 1925	\$1846.21	
Printing		\$1603.46
Stationery, mailing, envelopes, etc.		90.50
Postage		80.55
Engravings, etc.		57.16
Telegrams		3.55
Potato Ass'n. of America for $\frac{1}{2}$ of one active membership dues		1.00
Total of disbursements from Jan. 15, 1925 to December 24, 1925		\$1836.22
Balance of cash on hand		9.99
	\$1846.21	\$1846.21
Cash		9.99
Bills receivable		208.60
(Balance) Total resources on December 24, 1925		218.59

Liabilities — NONE

Audited and found correct. December 31, 1925.

Signed — E. A. Stokdyk
A. G. Tolaas

Now we have reached the point where careful consideration and thought should be given to the administration of The Potato News Bulletin for the coming year. The present editor has aimed under certain handicaps to build a firm foundation for The Potato News Bulletin and make it so worth while that every leader in the potato industry would desire to work for its advancement.

In aiming to put it across successfully the editor and business manager has not requested your authorization for the purchase of a filing case and other office equipment, instead the letters,, et cetera, have been filed in a box in which potatoes were shipped into the office last spring. There is an urgent need for office equipment. It is not necessary to purchase expensive equipment. This especially applies to a filing case, a good second-hand one would answer the purpose very well. One of the greatest needs is an addressograph. The seven attached cards from the Addressograph Company will convince you of the urgent need of an addressograph, especially card number seven.

Furthermore, provisions should be made for paying for services rendered if the work has to be done on personal time outside of regular office hours. This can be accomplished by increasing the membership. With three to five thousand names on the mailing list, advertising space would be worth more and easier to sell. Under such conditions the sale of advertising space would bring in a large revenue. A proposed basis for increasing the membership is given in an editorial on page 471 in the December number. You will notice that Vermont and Rhode Island are on par with the given basis and Montana and Nebraska have gone far over the top. What has been accomplished in one state can be duplicated in another under proper leadership.

There should be at least six associate editors appointed who will be responsible for the articles that are to be printed in The Potato News Bulletin the coming year. In other words, each associate editor should be responsible for the articles in two numbers. They should solicit the articles, collect and edit them and then forward the same to the editor far enough in advance so that the type for the articles is all set and corrected by the time the current material is ready for the press. This would facilitate the publishing and consequently The Potato News Bulletin could be mailed earlier each month. As much thought should be given to the selection of the articles for a given number as the preparation of a program for our annual meeting. The December number is a good illustration of what can be done when considerable thought is applied in selecting the articles.

Reporters on the condition of the crop shipments, et cetera, should be appointed for each province and state after they have consented to serve. This is a field in which too little attention has been given.

The editor feels that the present name of our publication has cost many dollars this year. The word bulletin and the size of the publication have a tendency to make some people put it in a class with State and Federal bulletins which are usually distributed free. The writer is not advocating a change in the size but in name only. Such names as American Potato Journal, The Potato Journal and The Potato News, would appeal more to prospective advertisers than The Potato News Bulletin.

In closing, the editor and business manager wishes to relate that he has enjoyed coming in contact with the leaders in the potato industry through the work of The Potato News Bulletin and will be glad to serve again in the same capacity the coming year under proper conditions and especially with the increasing cooperation that has been demonstrated the last two months.

Respectfully submitted,

Walter M. Peacock,
Editor and Business Manager.

SUPPLY OF THE DECEMBER NUMBER

Approximately 90 per cent of those who have joined since the December number has been circulated have requested that their membership begin December first so that they will receive this excellent number containing 12 articles on the fertilization of the potato crop.

Several copies are still available for new members who wish to date their membership back to December first, "First come, first served." The other day a Maine potato grower who joined in November, 1925 wrote that he had already received more than his money's worth. Such a comment speaks well for the last two numbers. Join now. Why delay? Remember—"Procrastination is the thief of time." Associate membership and the American Potato Journal \$1.00 per year. Make your check payable to the American Potato Journal and send it to the editor at 108 Baltimore Ave., Takoma Park, D. C.

SPINDLE TUBER—THE CAUSE OF "RUN OUT" POTATOES*

H. O. Werner

The spindle-tuber disease is held responsible for most of the "running-out" of seed potatoes in western Nebraska. Detail symptoms are enumerated. The most important facts developed as a result of experimental work are the following:

(1) When grown with soil temperature control apparatus, both normal and spindle-tubers were of better type at low than at high temperatures. Spindle-tubers grown at low temperatures were more nearly the true Triumph shape than normal tubers grown at high temperatures.

(2) Spindle-tubers produced in light soils (sandy) were of better type than normal tubers produced in heavy soils. When grown

* (This is a stenographic report of a speech detailing the results of five seasons work upon this problem. Some phases of the problem have been discussed previously in Nebraska Experiment Station Bulletin 207).

50.829

at the same temperature or in the same soil, spindle-tubers were, however, always more elongated than normal tubers.

(3) Spindle-tubers from tuber halves planted in Maine in 1923 were practically circular whereas the progeny of the other tuber halves planted in western Nebraska was 22 per cent longer than wide and showed much more extreme spindle-tuber symptoms. This was only a difference in expression of symptoms not in severity of the disease for in 1924 when the tubers from both Maine and Nebraska were grown in the same plat the progeny of both lots was practically identical in tuber type and disease symptoms. This difference is attributed to the difference in temperature, having averaged 68.7° in Nebraska and 58.5° in Maine during the 1923 season.

(4) The spindle-tuber disease was transmitted by tuber grafts. The following season the progeny of the "graft" plants showed symptoms as severe as those shown by the original spindle-tuber checks. The yield of the spindle-tuber checks and grafts was less than one-third that of the normal checks.

(5) In an irrigated field, spindle-tuber was transmitted to adjacent normal plants that were not protected from insects. (The reduction in yield the following year was to $\frac{1}{4}$ that of the normal checks). There was no transmission through the soil, for other normal plants from the same tubers when planted alternately with spindle-tubers but protected with insect cages, remained healthy and produced normal tubers the following year. Other pieces from normal checks planted in isolated dry and irrigated fields continued to produce healthy progeny. (Photographs of all the tubers produced in the second year, by these lines, are shown).

(6) Transmission occurred very early in the season for normal plants (located in a spindle-tuber field) when caged 10 days after emergence because generally infected, and produced tubers almost as inferior as those exposed all season. The caged and isolated checks remained healthy. (Photographs of tubers reproduced.)

(7) Harvesting potatoes from normal plants (alternated with spindle-tuber plants) as early as tubers of seed size were available, gave but very slight protection from spindle-tuber infection and was not a practical procedure. (Tuber photographs are shown.)

(8) Good type tubers selected from a lot exposed to infection reproduced seriously infected plants that produced a yield of less than 50 per cent of that of the normal seed when planted the following year.

(9) When spindle tuber plants were adjacent on both sides infection was greater than when present on only one side of normal plants.

(10) Spindle-tuber was effectively held in check by roguing relatively good strains grown in irrigated and dry land fields.

(11) The spindle-tuber disease progressed more slowly when seed potatoes were produced on dry land,—as compared with irrigation production, when tuber lines were used. This is probably

due to more favorable conditions for infection in irrigated fields, due to a better environment for insect life.

(12) Place effect did not seem to be a factor influencing the seed value of a lot of potatoes when diseases were eliminated from the seed plots.

(13) In a comparative plat, the per cent of spindle-tuber found in 56 lots of Triumph potatoes,—selected more or less at random from growers in the North Platte Valley,—ranged from 3 per cent to 99 per cent with a mean of 15 per cent. The yield ranged from 31 bu. to 288 bu. with a mean of 141 bu. The similarity of this mean yield and that of the entire irrigation project is considered significant.

(14) The number of years of irrigation was not directly correlated with high spindle-tuber content, but on the whole spindle-tuber was more serious with the length of time a strain had been irrigated. (No attempts having been made to eliminate the disease).

(15) The percentage of spindle-tuber found in dry land lots inspected for certification has been decreasing steadily since 1921, when the trouble was first noted as "run out" potatoes. Spindle-tuber was the chief cause for rejecting fields for certification in 1923.

(16) In a comparative trial plat grown in 1924 the following average percentage of spindle-tubers of No. 1 size were harvested: 116 lots certified in 1923—averaged 5 per cent spindle-tuber of No. 1 size; 49 lots entered for certification for the first time in 1924, averaged 4.2 per cent spindle-tuber of No. 1 size;

51 lots rejected for all reasons in 1923—averaged 12 per cent spindle-tuber of No. 1 size;

23 lots rejected because of spindle-tuber in 1923 averaged 20.5 per cent spindle-tubers of No. 1 size.

(17) Plants from seed infected with spindle-tuber were much slower in emerging than plants from normal or (healthy) seed.

NEW DEVELOPMENT OF POTATO MARKETING

Daniel Dean

The 1925-26 potato crop season has seen an immense expansion of the marketing of potatoes by motor truck. The writer has traveled and inquired widely in the states of New York, Pennsylvania and New Jersey and finds everywhere the situation that the proportion of the potato crop marketed to date by truck is much larger than ever before. The statistics of movement of car lots of potatoes do not therefore indicate the full consumption. Remaining stocks at the beginning of the second half of the consumption of the main crop, which is roughly about New Year's, are lower than would be indicated by the car lot figures.

Potato movement by motor-truck is only the expansion of the immense traffic by wagon haul which has always gone on. A

section like Aroostook or Idaho, far from market has always shipped by rail, and will in the future. States thickly dotted with cities like Connecticut have used the wagon in the past, not the railroad. Large parts of up-state New York, most of Pennsylvania and the potato growing areas in the corn belt have largely used the wagon haul in the past. Areas like Steuben County, N. Y. and Suffolk Co. on Long Island have used the railroad.

Expansion of truck movement has come because it carries the potato crop from the grower's farm almost all the way to the consumer, at least as far as the grocery. No doubt the truck costs much more than the railroad, mile for mile, but the saving in other costs makes the truck a competitor. Ever since its invention the truck has gradually taken more potatoes from the farm each year.

The explanation of the great expansion of this movement in the single season of 1925-26 is not hard to find. The severe drouths of last summer and spring shortened as well as ripened the early crop through to New Jersey. By September 1st, the New Jersey crop was nearly shipped out.

The month of August found potatoes at a price which stimulated the heaviest movement on record from the northern main crop states. Roughly speaking, our main crop territory is made up of two parts, one shipping all by rail, as Aroostook, and another, such as up-state New York and Pennsylvania which is so dotted with great manufacturing cities that but few counties are out of the reach of a motor-truck from some city. The record movement of early potatoes from Aroostook was being paralleled in these areas by a very heavy shipment by truck. From every northern city trucks were going in every direction. A considerable part of the traffic was over 100 miles, as from Suffolk Co., Long Island to New York City, and from Potter Co., Pa. to Buffalo, N. Y.

High prices for potatoes paid the costs of the long trips. At \$2.00 to \$2.50 a bushel the truckman could get a margin of profit which would pay for a 100 mile haul where the margin last year on potatoes at 50 or 75 cents would not pay for 50 miles. First a wide spread attack of late blight and rot, and then a far wider freeze injury in late October further stimulated the growers' wish to sell, which had begun earlier under the pressure of debts accumulated by lean potato years.

An indication of the extent to which local supplies of potatoes have been exhausted is shown by recent reports of the Rochester office of the department of agriculture. Great cities like Buffalo, Rochester and Syracuse are being forced to send to the car lot shipping sections for their supplies. Already a number of cities have had to buy more cars than in the whole of the New York state shipping season a year ago. From southern New England most of the way to the Missouri river the steady reduction of local potato supplies by motor-truck has created a shortage which must be filled next spring from the northern and western car lot shipping sections, in addition to the normal demand from the large cities which they have always filled in the past.

NEW PRICE RECORDS FOR POTATOES

(Contribution from the Fruit and Vegetable Division, Bureau of Agricultural Economics, U. S. Department of Agriculture)

Potato markets broke all recent records when Chicago carlot sales of sacked Northern Round Whites and Idaho Russets were made on December 28 and 29 at \$4.25-\$4.50 per 100 pounds, while New York Round Whites were selling in New York City at \$4.65, with Maine Green Mountains touching \$4.85-\$5.15. At the end of the year, bulk Long Island Green Mountains brought the extremely high price of \$5.15-\$5.30 on the New York market, and sacked Pennsylvania Round Whites had advanced to \$4.65-\$4.85 in Philadelphia and Baltimore. Top of \$5.00 was quoted on Red River Ohios by Cincinnati dealers. Texas sales of Colorado potatoes reached \$4.75. By January 2, however, there were signs of weakening, and the Chicago carlot price had slipped back to \$4.00-\$4.25 on far western stock and \$3.90-\$4.10 on northern potatoes.

During the week ending January 9, the Chicago carlot market fluctuated considerably, but closed firm on sacked Northern Round Whites at \$4.05-\$4.25 per 100 pounds. Top of \$4.85 had been reached in Cincinnati. Eastern distributing centers evidenced a slightly weaker tendency. New York City final quotations were \$4.50-\$4.75 on sacked New York Round Whites, \$4.85-\$5.00 on Maine Green Mountains and \$5.15-\$5.20 on bulk Long Island Green Mountains. New potatoes from South Texas were jobbing at 7 cents per pound in St. Louis.

Highest mark of the season was reached at Presque Isle, Me., on the last day of 1925, when f. o. b. quotations on bulk Green Mountains were \$4.25-4.35. About 65 cents was the price a year ago. The western New York f. o. b. market held firm at \$4.40 on sacked Round Whites, while North Central shipping points reached their height in late December at a general range of \$4.10-\$4.40. Later sales were made at slightly lower levels. Cash track prices on Russet Burbanks touched \$3.35-\$3.40 in the Idaho Falls district, and then reacted under the limited demand. Growers in Colorado got as much as \$3.25 and \$3.35 per 100 pounds, with returns in western Nebraska as high as \$3.50. Eastern and northern shipping points showed even greater strength than in October—the time of the previous sharp advance. By January 9, partly-graded Bliss Triumphs had touched high mark of \$4.25-\$4.50 f. o. b. the Minneapolis-St. Paul shipping district, and western Nebraska growers were receiving \$3.65 on Bliss Triumphs, with demand active.

Combined shipments from the leading late States increased rapidly to 3,925 cars during the period January 3 to 9, but were still 1,300 less than during the same week last season. Minnesota, Wisconsin and Washington made important gains. Maine and Idaho led as to volume of shipments. Some shipments from northern

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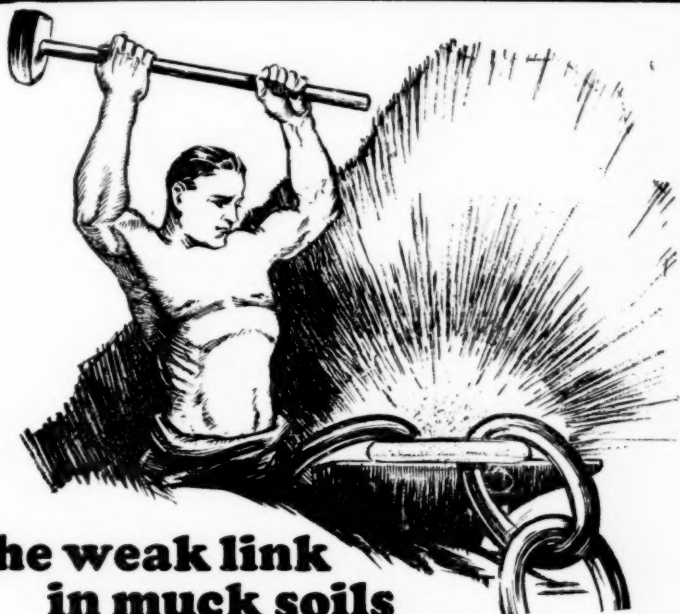
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sections were seed stock, going South. Canadian potatoes were arriving more freely, particular through Boston, and 15 carloads came from Bermuda. Imports from Canada have already exceeded 1,500 cars to date, as against 190 all of last season. Based on the good prices cars to date, as against 190 all of last season. Based on good prices being received in Canada, it is estimated locally that \$8,000,000 will be distributed among potato growers of New Brunswick alone, before the season is ended.

Fewer Potatoes Used on Farms

Official reports indicate that fewer potatoes are being eaten on the farms this season and that the quantity saved for seed in the important states is slightly greater than last year. General quality of the crop seems to be better. In the 19 surplus-producing states, which grow nearly three-fourths of all the potatoes, it is estimated that about 24,000,000 bushels were classed as cull potatoes at harvest time. This quantity was unfit for food or seed and is mostly fed to livestock, sold for starch, or lost. In the previous season, more than 32,000,000 bushels of potatoes in these 19 important States were classed as culls. This year, approximately 40,500,000 bushels are believed to have been reserved for food on farms where grown, compared with 43,000,000 last season. Estimates indicate 21,775,000 bushels saved for seed,—an increase of 315,000 over the preceding year. After deductions for all these purposes, apparently only 146,500,000 bushels remained available for sale at harvest time,—a decrease of nearly 60,000,000 from the 1924 total. As a rule, slightly over half this remaining quantity is shipped in carlots, which would mean that approximately 145,000 carloads of 600 bushels each might be shipped, if this were a normal season. But this group of states had already shipped 102,000 carloads of potatoes to January 9, thus indicating that more than the usual percentage of available stock probably will be forwarded this season. As a general rule, about half the season's shipments are completed by January 1. In the 16 deficient-producing late-potato States, the 21,800,000 bushels reserved for food is 5,000,000 less than last year, and apparently 35,500,000 bushels remained for sale at harvest time, compared with 57,000,000 the year before. Usually, only half or less of this available supply is shipped in carlots, indicating possibly 25,000 or 30,000 cars this season from this group of states.

The final potato report, showing an estimated 1925 crop of only 323,243,000 bushels, doubtless was the important factor resulting in the recent high prices. The market began to advance almost as soon as the crop report was released on December 22. Final estimates for the year were revised on the basis of recent farm census reports and other data. Acreage was reduced from the original figure published in July and average yield per acre was left almost as reported in November, so that the estimated production was reduced 23,260,000 bushels from the November report. Similar



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changes in last year's figures brought down the 1924 crop to 425,283,000 bushels, a decrease of 29,501,000 from previous reports. Compared with the November estimate, slightly more than half the net reduction in this year's crop is in the 16 deficient-producing late-potato states and about one-fourth in the 19 important surplus states. According to the July estimate of population, the 1925 crop averages only about 2.8 bushels per capita, as against 3.77 bushels per capita for the 1924 crop on the basis of January, 1925, population figures. In the December revision, it was found that a few states, particularly Maine and Colorado, had more potatoes than expected. An increase of 3,200,000 bushels in Maine makes that, by far, the leading state this year. Minnesota ranks second with nearly 27,000,000 bushels, but this is 7,000,000 less than in Maine.

POTATO NOTES

Florida.—The potato situation in this locality, on account of the high cost of seed and fertilizer and also scarcity of labor a number of our larger farmers have reduced their Irish Potato acreage this year, while some of the unsuccessful smaller growers were forced out of business, and as a result I think the potato acreage in the Hastings district will not exceed 13,500 acres this year as against 15,000 last year.

Due to the exceedingly unfavorable weather conditions planting has been delayed. Usually at this time of the year, we are practically through planting, while at the present time we are not more than half through. I anticipate we will be fortunate if we are able to finish up by Feb. 10th. This is to be regretted because if other sections north of us come in on time our crop will over lap and it may hurt all early potato-growing sections.

Prospects for prices never seemed to be brighter. Very nearly all of the leading markets are inquiring as to the price at which crops can be purchased at harvest time, but so far as I know, no one has ventured to make a price, as digging will not start under most favorable conditions until early in April, and the growers feel inclined to take their chances with the market, especially when the outlook at this time looks so flattering.

Quite an acreage in former years has been planted in certain sections over the State totaling perhaps 5000 acres. This of course is outside of the Hastings belt. According to the best information I am able to obtain, I feel sure that this acreage has been cut 50 per cent, in other words will not exceed 2000 to 2500 acres in the entire State outside of the Hastings district.—G. W. Waller, January 16.

Virginia.—The present indications are that the truckers in Eastern Virginia will plant the usual acreage of potatoes this spring.

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The high price of seed stock may, in a few cases, deter some of the small growers from planting the usual amount, but, on the other hand, some of the larger growers, because the anticipation of high prices during the early shipping season, will plant slightly more than the usual amount.

The writer has recently returned from Accomac and Northampton Counties on the Eastern Shore of Virginia, where he attended several Farm Bureau meetings. The question of potato fertilizers has been discussed. The Virginia Farm Bureau has mixed for its members about 6,000 tons of potato fertilizer of a special formula recommended by the Virginia Truck Experiment Station. This formula has given such consistently good results during the past two years that the amount which will be used by the truckers this season will be far in excess of what was ordered last year.

The growers throughout the Tidewater section are becoming more interested in the best grade of certified seed. The Farm Bureau of Accomac County has appointed a seed improvement committee which will have charge of the demonstration strain plats for the coming season. The results during the last two years have convinced the farmers that it is of the utmost importance that they secure seed potatoes from sources best suited to their conditions. The seed improvement committee expects to have a much more elaborate demonstration than during previous years.—H. H. Zimmerly, January 16.

POTATO MEETINGS

THE KANSAS CITY POTATO MEETING

Wm. Stuart

Members of The Potato Association of America who were fortunate enough to be able to attend the Twelfth Annual Meeting of the Association will agree with the writer that it was the best ever held by our Organization. This estimate of the meeting is not based so much upon attendance as upon the number and character of the papers presented, many of which were of unusual interest and merit.

The report of the Secretary-Treasurer, which dealt exclusively with the active membership of the Association, showed that there was a slight gain in membership over the previous year despite the fact that, owing to the creation of an associate membership at the 1924 meeting, several active members had transferred their names to the associate list. The financial statement showed a considerably larger balance on hand than that of the previous year.

The Editor and Business Manager's report indicated that the publication of the twelve issues of "The Potato News Bulletin" had involved no little effort on his part to secure material for each number as well as to sell sufficient advertising space to make it

possible to finance the cost of the publication and other incidental expenses, such as stationery, postage, etc. Notwithstanding these vicissitudes it was possible to report a small cash balance of \$9.99 and bills receivable of \$208.60 at the close of the year.

An especially fine report was made by the Research Committee through its four subcommittees covering the following activities (1) Physiological investigations, (2) Pathological investigations, (3) Genetics and seed improvement, (4) Soils and cultural investigations. Excellent reports were also read by the chairmen of the committees on "Varietal nomenclature and variety strain testing" and that of "Seed potato certification." The report of the chairman on "Potato marketing" was received too late for presentation. The "Membership" committee report showed a total active membership of 490 with an associate membership of over 500. Analysis of the active membership showed representation in 39 states and in all of the Canadian Provinces. Of the seven foreign memberships two are from Russia, one from the Orange Free State in South Africa and the balance from England and Scotland. The desirability of a much larger active and associate membership was emphasized if the Association is to continue its publication and pay its own way as it goes.

The papers presented at the "Seed Improvement Methods" session Tuesday afternoon furnished convincing evidence of the value of regional disease demonstration plots for the training of field inspectors. This was forcefully illustrated by charts giving data on disease readings taken by those in attendance at a conference of inspectors held in New Jersey in June, 1925. The wide variation in the first readings of the different observers present indicated a wide difference in the concept of the expression of certain diseases of potatoes. Reinspection of the disease plot and more careful diagnosis of the symptom characters of disease under field conditions served to harmonize, to a large extent, the disease readings. It was the unanimous opinion of those present that such field conferences were not only desirable but absolutely essential to the successful conduct of seed certification work. This line of thought was continued a little later though in a slightly different manner under the guise of "The value of the certified seed test plot in certification" in which it was pointed out that the maintenance of a seed test plot planted with the various strains of seed entered in the state for certification is very essential to the success of the work in that it furnishes the inspector with an opportunity to study the various lots of stock for the presence of disease or mixtures before making field inspections. The methods employed in the administration of "Seed potato certification" and some of the difficulties encountered as discussed by A. G. Tolaas elicited numerous questions as did also Folsom & Shultz's paper on "Methods of conducting and the importance of the seed plot in potato improvement work." The "Problems confronting the certi-

fication authorities" were ably handled in papers read by McLeod of New Brunswick, Moore of Michigan, Werner of Nebraska and Harrington of Montana, whose paper was read by Morris of Montana. The certification committee report on uniform certification standards provoked considerable discussion resulting in some changes and the recommendation that a further report be prepared in regard to grade requirements of seed stock with particular reference to surface disease tolerances. This report was presented at a later meeting and favorable action taken. Especially interesting papers were read at the Wednesday afternoon session on "Seed potato disinfection methods." Nine of the ten papers listed were presented. As the papers were so generally of such a high order of excellence it is difficult, if not somewhat embarrassing, to attempt to single out any particular one as being par excellent. The one which impressed the writer most was that dealing with "The hot formaldehyde method of treating seed potatoes." Possibly this was due to the practical application of the method to commercial seed treatment. In other words to the wholesale rather than the retail method of seed potato disinfection. This phase of seed treatment was still further emphasized by the papers of D. R. Porter of Kansas, E. M. Page of Missouri and Askegaard of Minnesota, in which the lantern was used to illustrate equipment employed and rapidity of operation possible.

Sanford's paper on "Some soil factors affecting the development of common scab contained many suggestions as well as certain facts as to the reasons for the different reaction of some soils to applications of acidifying agents for the control of scab.

The joint session with the American Phytopathological Society, which was held in the conference room assigned to our Association, drew the largest attendance during the meeting and the papers presented were listened to with great interest. This was particularly true with respect to Leach's paper dealing with "The relation of the seed-corn maggot to potato black-leg." By means of lantern slides it was possible to give those in attendance a very clear idea as to the method of transmitting black-leg by the larvae of the corn fly maggot. The relative importance of alternaria tuber rot as brought out in Gratz and Bonde's paper on this disease proved somewhat of a revelation to certain members. This disease seems to cause more damage to the Spaulding Rose variety than to any other though it is by no means confined to this variety alone. The apparent ease with which the tubers are infected from the spores was well brought out in the spread of the disease in a barrel of Spaulding tubers which had been covered in the field with alternaria infected vines for a short period. This resulted in almost every tuber becoming infected.

Thursday's sessions were devoted to papers of a more or less general nature. The paper dealing with "Northern vs. southern grown seed", by Martin, Peacock, and Lombard brought out the fact that the vigor of a strain of seed can be maintained in southern



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New Jersey when given proper cultural attention. Werner's paper on "Environmental factor in relation to the productiveness of seed." brought out the fact that many factors may influence the quality of the seed. Further evidence supporting this fact was furnished in Edmundson's paper on "Time of irrigation an important factor in potato production." Fitch's paper brought out many points in regard to the "Problem's of local supply of seed potatoes in the corn-belt region." Moore's studies of the reasons for hollow heart in potatoes indicated that this trouble can be largely controlled through closer planting, the use of larger seed pieces, avoidance of use of too much nitrogen and good cultural care. Stokdyk showed that the marketing of potatoes from mid-west sections in midsummer is a distinct phase of potato marketing. The value of a good pack and brand was emphasized. The "Red Star" brand of the Eastern Shore of Virginia Produce Exchange was used to illustrate the marketing value of a brand.

The following motions, reports and resolutions were adopted: That the name of "The Potato News Bulletin" be changed to that of the "American Potato Journal."

That the plan of underwriting the Association's activities as outlined in circular letter sent to active members be approved and

that the Executive Committee proceed as expeditiously as possible in the securing of pledges necessary to the completion of the \$3000 fund, also to exercise such supervision of the policy, or policies, of The American Potato Journal as may seem desirable.

The report of the nominating committee was received and after the substitution of W. H. Martin's name for Secretary-Treasurer, in the place of the former incumbent's, was unanimously adopted.

The officers elect for 1926 are as follows:

President—Daniel Dean, Nichols, New York.

Vice-Pres.—W. H. Tawse, MacDonald College, P. of Quebec.

Sec.-Treas.—W. H. Martin, Agr. Coll., New Brunswick, N. J.

Editor and Bus. Mgr.—W. M. Peacock, Washington, D. C.

H. O. Werner, Coll. of Agr., Lincoln, Nebr., and E. D. McSweeney of Rosemead, Calif. were elected to serve with the above officers as members of the Executive Committee.

The committee on resolutions report was adopted as presented. This report is as follows:

"Whereas, considerable confusion and serious financial loss has resulted from the practice of growers, dealers and seedsmen selling varieties of seed potatoes incorrectly named, we urge that steps be taken to prevent such practice.

To such an end we, the members of the Potato Association of America in conference assembled, unanimously adopt the following resolutions:

Resolved: That the Federal Department of Agriculture in cooperation with the various Agricultural Colleges and Experiment Stations, conduct a comprehensive study of potato varieties as offered by seedsmen, dealers, and others in this country to determine the trueness to name of the stock and its varietal purity. It is urged that such findings be made public through reports giving the name of the grower, dealer or seedsman from whom the stock was purchased. It is recommended that an official variety register book be maintained by the Federal Department of Agriculture so that potato variety standardization will be assured, and the re-naming of old varieties discontinued.

Be it further resolved, that whereas the Office of Horticultural Investigations of the Federal Department of Agriculture is now making a preliminary study of potato varieties that this office assume the leadership of a more extensive study, and be it further resolved that for this purpose the Secretary of Agriculture ask for a substantial appropriation to defray the expenses of such a study.

Whereas the matters that follow may not properly come in any other way before the Potato Association of America assembled in its 12th Annual Meeting at Kansas City, Mo. but since their importance calls for the attention of this body, be it resolved:

That inasmuch as Congress now in session is acting upon appointing a market finding commission to facilitate the marketing

of agricultural products and that the marketing of the enormous potato crop produced yearly is a big factor, that we petition Congress to appoint a member of the Potato Association of America on this commission.

Resolved: That we endorse the continuation of the embargo against foreign potatoes, designed to prevent the further entrance of stock that may be infected with Black Wart, as well as the further maintenance of the zone about those areas of the United States where the disease is now found.

Resolved: That we caution seed growers and potato men generally against being stampeded, in view of present high prices and low stocks of good seed, into planting unduly large acreages with indifferent seed, but that they plant only normal acreages, using only the best of seed.

Be it further resolved, that The Potato Association of America wishes to express its appreciation of the faithful and consistent services of Walter M. Peacock in the performance of the duties as Editor-in-Chief of The Potato News Bulletin.

And be it further resolved, that the Potato Association of America desires to express its sincere appreciation of the many courtesies extended the Association by both the general and local committees of the American Association for the Advancement of Science and also to the Kansas City Athletic Club for the privilege of the use of their commodious and comfortable rooms during the convention, thereby materially assisting in making this annual meeting of the Association a most interesting and profitable one to the members and visitors in attendance.

M. B. McKay.

P. N. Davis.

John S. Gardner.

} Resolutions
Committee

ANNUAL MEETING OF THE NEW JERSEY STATE POTATO ASSOCIATION

Wm. H. Martin

The annual meeting of the New Jersey State Potato Association, held Thursday, January 14, was well attended and the program as arranged proved to be of considerable interest. Dr. J. G. Lipman, Director of the New Jersey Agricultural Experiment Station, discussed the question of potato fertilization, particularly the use of concentrated mixtures. Mr. E. R. Biddle, of the Bureau of Agricultural Economics, reviewed the past potato season and discussed the prospects for 1926. Wm. Duryee, Secretary of the N. J. State Department of Agriculture, gave an interesting report on the results of the potato improvement campaign conducted last season. The results of this campaign showed a marked increase

in the use of certified seed and a considerable decrease in the acreage planted with the American Giant variety.

W. H. Martin reviewed the results of potato investigations in the afternoon and was followed by Daniel Dean of New York who discussed potato spraying. R. F. Poole, L. G. Schmerhorn and E. Douglass discussed the possibility of substituting other crops for potatoes in central New Jersey.

The potato show this year was much smaller than in the past due to the fact that no exhibits of table stock were displayed. The show was limited to the late crop and a number of excellent lots of Irish Cobbler were displayed. The championship cup was awarded to Cumberland County.

NOTES ON RECENT LITERATURE

ANONYMOUS.—Certified vs. Non-Certified Seed.—*Thirty-eighth Ann. Rpt. S. C. Exp. Sta. p. 61, December, 1925.*

Tests covering four seasons have been conducted in seven different counties viz.: Georgetown, Berkely, Spartanburg, Charleston, Colleton, Hampton and Sumter. Of the twelve experiments reported as completed certified seed proved superior to non-certified in ten of them while the non-certified gave a larger yield in two of the experiments. The average yield of certified seed in all the experiments was 57.1 barrels per acre and that of non-certified seed 49.9 barrels per acre. The greatest difference in yield occurred in Colleton County in 1924 where the certified seed outyielded non-certified seed by 26.5 barrels per acre. A bulletin giving the results of the entire four years experimental work is said to be in course of preparation.—**W. Stuart.**

ANONYMOUS.—Colorado's Seed Potato Problem.—*Through the Leaves, 14: 19, Jan. 1926.*

In a paper read by W. F. Heppe, Field Manager of the Colorado Potato Growers' Exchange, at the Fourth Annual Colorado Pure Food Show recently held at Colorado Springs, entitled "Seed Potato Needs and Ways of Meeting the Demand" an attempt was made to show that with proper care Colorado can produce her own supply of seed potatoes. At the present time, Colorado is standardizing on the Brown Beauty, Peach Blow, People's, Rural New Yorker, and Russet Burbank in the late varieties and Irish Cobbler and Triumph in early varieties. The carlot demand for certified seed, however, calls for approximately 70 per cent Irish Cobbler, 20 per cent of Rural New Yorker and the balance largely for Triumph. The statement is made that there is a marked trend among the members of the Colorado Potato Growers' Exchange in some sections toward an increased production of the Rural New Yorker variety and a decrease in that of People's. It is recommended that every effort should be made to produce a superior product and then to advertise this fact.—**W. Stuart.**

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ANONYMOUS.—Fertilizer Tests with Irish Potatoes.—*Thirty-eighth Ann. Rpt. S. C. Exp. Station. pp. 59, 60, 1925.*

The report is based on a three years test at Clemson College and Summerville and four years at Florence. The average results at Clemson College showed that a 7-5-5 fertilizer applied at the rate of two tons per acre gave the largest yield, 66.4 barrels per acre. The land used was a rather poor, sandy river-bottom soil. A three per cent nitrogen in a complete fertilizer gave nearly as good results as a five per cent or a seven per cent. This was thought to be due to the fact that cowpeas have followed potatoes on the plots used for the past two years. Potash was found to have considerable value to the potato crop as the yield increased as the potash percentage increased.

At Florence the four year test demonstrated that 7-5-9 fertilizer produced the highest average yield of 86.6 barrels per acre. The soil used at Florence was a fine sandy loam which was much more fertile than that at Clemson College. As in the preceding experiment potash seemed to be the limiting factor. At Summerville the limiting factor seemed to be nitrogen. The formula found to give the best results was a 7-7-5 mixture. The largest yield was 73.3 barrels. It is proposed to continue the tests for another two years.

In a source of potash test conducted at Clemson College during the years 1923-25 inclusive the three common potash salts were compared viz: muriate, sulphate, and kainit. The three year average shows that sulphate of potash made the highest yield, 52.6 barrels, Muriate of potash plots averaged 47 barrels and kainit 43.7 barrels, while no potash plots yielded 35 barrels per acre.—W. Stuart.

ANONYMOUS.—Potato culture in Scotland.—*Scot. Bd. Agr. Misc. Pub. 5 (1925), pp. 77.*

The proceedings of the potato conference held August 20 and 21, 1924, at Edinburgh, Scotland, are reported, together with the following papers:

Survey of the Work of the Board of Agriculture for Scotland in the Certification of Potato Stocks and the Registration of Im-

mune Varieties, by J. Wood; Field Trials of Potato Varieties, by J. A. S. Watson; The Classification of Varieties of the Potato, by A. Millar; Practical Effects of Degenerative Diseases and Variations on Potato Stocks, by T. Anderson; Potato Diseases, by G. H. Pethybridge; and Potato Breeding, by J. M. F. Drummond. — H. M. Steece.

ANONYMOUS.—Breves Instrucciones el Cultivo de Papas.—*Ministry Agr. Argentine Republic Circ. No. 502, pp. 1-20, Aug., 1925.*

In the Balcarse district Province of Buenos Aires 80,000 hectares (a hectare is 2.47 acres) of potatoes are grown. Only one crop is produced; this is planted about October 15 and is harvested in March. The average yield is about 6000 kilos (a kilo is 2.2 lbs.) per hectare (approximately 89.4 bushels per acre). In the Rosario district Province of Santa Fe' 17,000 hectares are grown. Two crops are produced the first of which is planted in August or September and is harvested in December and January. The second crop is planted in February and March and is harvested in May and June. About the same yield is obtained as in the Province of Buenos Aires. Other data is given regarding the Andina zone in Mendoza and San Juan. General instructions are given regarding the culture of the crop.—W. Stuart.

DANA, B. F.—The Rhizoctonia disease of potatoes.—*Washington Agr. Exp. Sta. Bul. 191, p. 3-78, figs. 13.*

Rhizoctonia is indigenous to the western soils and persists under cultivation as a parasite on many hosts and as a saprophyte on plant remains in the soil. Rhizoctonia attacks the root system of plants at all stages and the most important injury is caused by death of feeding roots. It increases the percentage of cull potatoes and off-type tubers and reduces the yield and quality of the large tubers. This disease produces cankers on the stem and disturbs the nutrition of the plant often causing rosette type of plant, giant tops and other abnormalities.

Other crops following the potato crop infected with this disease are injured because of the virulence of the parasite left in the ground.

Control

1. Seed Selection. It was found that selection is practically as efficient as seed treatment in limiting disease in the potato crop. Planting tubers free from sclerotia in soils reasonably free from virulent strains of the fungus will be found valuable. It is suggested that the infected tubers may be picked out and disinfected by themselves.

2. Seed Treatment. Seed treatment with mercuric chloride was employed to kill the resting form of Rhizoctonia, the sclerotia, on the seed tubers. The potatoes should be treated before the sprouts start. The author is recommending that the seed should be kept moist 12 to 24 hours before treatment and then dipped in a solu-

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tion of corrosive sublimate 4 oz. to 30 gal. water for 1½ hours. In treating large lots of seed, for each four bushels of seed treated, add ½ oz. of corrosive sublimate after each lot is removed and keep the volume of the solution constant by addition of water.

Discard the treating solution when it gets dirty or after eight lots of seed have been treated.

Cultural Practices

Lower temperatures and favorable moisture conditions at the beginning and end of growing season account for increase of the disease in early plantings and on tubers left in the soil until the advent of cool moist autumn weather.—**Walter M. Peacock.**

GOLDTHWAITE, N. E.—Potatoes from the housekeeper's standpoint.—*Colorado Sta. Bul. 297, pp. 1-32, fig. 5. Oct., 1925.*

The author considers the cooking quality of the potato, in this country, to be based chiefly upon its mealiness when cooked. The highest quality is to be found in mature tubers containing a high proportion of starch. The outer layer, the cortex, contains the highest percentages of starch, mineral matter and nitrogenous substances therefore waste of this part of the tuber should be avoided in peeling.

Greening of the tubers by exposure to light causes the development of solanin which is bitter to the taste and is poisonous.

The principles involved in the cooking of potatoes are based upon the bursting of the starch grains and softening of the cellulose framework as the result of heating the internal water of the tuber by the external application of heat. Four methods of cooking are discussed; boiling, steaming, baking, and frying. Many suggestions are given for cooking among which the author points out that in boiling potatoes they should always be put into hot water rather than cold; that steamed potatoes usually "keep their shape" better than boiled ones but seem less mealy; that to prevent sogginess of baked potatoes the skin should be slit open with a knife as soon as they are done; and that in frying potatoes the pieces of raw potato should be as dry as possible and the fat should be smoking hot.

An appendix is included which gives the composition of the earth and the human body, also a discussion of the classes of compounds which constitute our foods. The derivation of a number of scientific terms is given in a glossary.—C. F. Clark.

GOLINSKA, JADWIGA.—*Sur la Tuberization des Pommes de Terre Cultivees des Boutures*.—*Obitka z. No. 9 Extract des Acta Societatis Botanicorum Poloniae* 2, No. 1, 1924.

Two phases alternate in the life of the potato; in one phase the differentiation corresponds to the development of an annual plant, in the other, which is the formation of tubers it commences with the enlargement of the terminal end of the stolons into tubers. With the formation of tubers there is no further differentiation of aerial part of the plant. Plants were propagated in two ways. A. by rooted cuttings; B. by layered branches. Plants rooted by each of these methods were set out in the field and were harvested when mature. All plants of series A had formed subterranean tubers several of them having two to three large ones of irregular shape which resulted in the development of adventitious tubers to the principal ones. The A plants only developed one to two stolons, each of which were either simple or ramified. In the latter case a single stolon often bore several tubers in string fashion. In the case of the B plants not a single one produced tuber bearing stolons, but aerial tubers were borne on the lower part of the stems near the soil.—W. Stuart.

GUSSOW, H. T.—Off-type tubers.—*Canada Expt. Farms, Div. Bot. Rpt., 1924, p. 29.*

6012
A number of different off-type tubers from certified Green Mountain and Irish Cobbler potatoes were planted in soil conducive to the production of normal forms. Upon harvesting it was observed that less than 1 per cent of the progeny from the strawberry type, bull nose cylindrical type, wasp waisted type, or the type pointed at seed end resembled the parents in type. Round oblong (rose on end) showed 15 per cent round oblong with rose on the end and 6 per cent rose on the side, while round oblong (rose on side) showed 3.5 per cent round oblong with rose on the side and 10

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per cent with rose on the end. It is concluded that these abnormal characters are not dominant and are probably produced by some factor other than heredity.—H. M. Steece.

KOTILA, J. E. AND G. A. COONS.—Potato spraying and dusting experiments in Michigan.—*Mich. Agr. Exp. Sta. Tech. Bul. 72, p. 3-15. Fig. 1, Plates 2, Oct. 1925.*

In this experiment the comparative values of spray and dust applications were determined by large plots of potatoes, frequently replicated and with abundant check plots. In 1922 when hopper burn was very severe and both Bordeaux mixture and copper-lime dust showed increase yields in treated plots over the check plots, the Bordeaux mixture plots gave an increase of 74 bushels per acre over the untreated plots. The results of the seasons of 1923 and 1924 indicate that the gains from the applications of Bordeaux mixture may be attributed to its protective action against fungus and insect attack because during these two seasons, in which disease was not a factor, no consistent gain from spraying was demonstrated. According to the results of this experiment the applications of Bordeaux mixture does not produce a stimulative effect and the increase in yields is due to the control of fungous diseases and insect pests. The high cost of the dusting material made the application of copper-lime dust uneconomical. The authors recommend the continuance of the standard practice of spraying potatoes with Bordeaux mixture.—Walter M. Peacock.

MARTIN, WM. H.—Potato spraying in 1925.—*Hints to Potato Growers*, Vol. 6, No. 5., September, 1925.

The author states that for 12 years the N. J. Experiment Station has been conducting tests in different parts of the state to determine the practicability of spraying and the results secured clearly indicate that it is not only practicable but that the potato grower **who does not spray is not getting the returns he should.** In 1925 the spray tests were conducted at Freehold and at Elmer, N. J. and increases amounting to over 50 bushels an acre resulted. The author also states that reports from growers who sprayed indicate that they secured even greater differences in yields and in some cases the difference in cash returns amounted to approximately **one hundred dollars** an acre above all costs.

Applications of Bordeaux mixture kept the flea beetle, leaf hopper, early blight, tip burn and hopper under control so that the plants remained growing longer and increased the yield. Copper lime dust applied early in the morning while the dew was still on the plants afforded some protection against leaf hoppers and flea beetles but was not as efficient as Bordeaux mixture.—**Walter M. Peacock.**

MARTIN, W. H. AND W. M. PEACOCK.—Northern vs. southern grown seed.—*Hints to Potato Growers* 6 (1925), No. 8, pp. (1)-(3).

Experiments carried on cooperatively by the New Jersey Experiment Stations and the Office of Horticultural Investigations, U. S. Department of Agriculture were concerned with the comparative value of Maine-grown seed potatoes and seed of the same strain grown for one or more years in New Jersey.

Irish Cobbler potatoes grown in New Jersey as a late crop germinated and matured later than the same strain grown in Maine, whereas differences in germination or maturity were not observed in New Jersey and Maine grown Green Mountains.

In tests conducted in 1923, 1924, and 1925 in Maine with Green Mountain potatoes the Maine-grown seed averaged 309.9 bu. and the New Jersey-grown seed 310 bu. In three tests with Irish Cobbler New Jersey-grown seed slightly outyielded the Maine-grown seed, whereas in the fourth test the Maine-grown seed gave such an increase that the Maine-grown seed averaged 315.3 bu. per acre and that grown one year in New Jersey 312.4 bu. In Connecticut, New Jersey-grown Irish Cobblers out-yielded Maine-grown seed in four tests, the yields averaging 211.1 and 206.7 bu. per acre, respectively. In tests in New Jersey with Green Mountains Maine-grown seed averaged 120.7 bu. and New Jersey-grown, 112.7 bu. per acre. Difference in size of seed piece used, however, would account for the yield difference. The average yield of Maine-grown Irish Cobblers was 109.6 bu. as compared with 113.9 bu. for the same strain grown for one year in New Jersey.

Irish Cobbler potatoes two and three years removed from Maine yielded as well as seed one year removed. Although a larger seed

piece was planted of Maine Irish Cobbler in New Jersey tests, the average yields are slightly in favor of New Jersey-grown seed.

The authors concluded that when potatoes are planted in New Jersey as a late crop and the necessary measures are adopted for the elimination and control of diseases the tubers produced are as vigorous for seed purposes as those grown in the northern states. Seed potatoes grown year after year as a late crop in New Jersey will yield as well if not slightly better than the same strain grown in Maine.—**H. M. Steece.**

Edited by **PATERSON, W. G. R.**—Farm crops, I-IV.—*London: Gresham Pub. Co., Ltd., 1925, vols. 1, pp. IX+356, pls. 10, figs. 36; 2, pp. VII+306, pls. 9, figs. 51; 3, pp. VII+307, pls. 2, figs. 15; 4, pp. VII+316, pls. 3, figs. 57.*

The contributors to this comprehensive treatise on farm crops have endeavored to present full information regarding the principles underlying maximum crop production, especially for conditions in the British Isles. The four volumes which embrace articles by specialists in the various lines of work are (I) Grain Crops, (II) Root Crops, (III) Pastures and Hay, and (IV) Miscellaneous Crops.

The papers in Volume II which relate to potatoes include The Early Potato Crop, by J. M. Hannah; The Potato Crop, by R. G. White; Composition and Products of the Potato, by R. A. Berry; Cost of Production of Potatoes, Turnips, etc., by J. Wylle; Diseases of Root and Potato Crops, by D. G. O'Brien; and Insect Enemies of Root and Potato Crops, by L. A. L. King.—**H. M. Steece.**

POLLOCK, N. A. R.—Potatoes in North Queensland: Comparative Trial on Tableland and coast.—*Queensland Agr. Jour.* 24: 348-350, 1925.

Variety trials on Tableland and Coastal farms were conducted. The most interesting study, however was that relating to the home production of a reliable seed supply. Seed produced on the Tableland area during the winter months serves as a source of supply for the spring crop in the Coastal area. Tableland plantings are usually made in November or December while Coastal plantings are made from the middle of March until May. The Tableland area has an altitude of 2000 ft. or more, while the Coastal area is much under 2000 ft. The Up-to-Date variety gave the heaviest yield.—**W. Stuart.**

FROM, GEORGE.—La Maladie Verruqueuse de la Pomme de Terre en Alsace.—*Bul. de la Soc. des Agriculteurs du France* 57th année pp. 297, 298, 1925.

An account is given of the presence of wart disease in Alsace and another infection center in France. Last September it was reported for the first time in France in the canton of Schirmeck by a grower in Heisbach. A brief summary is presented in regard to its occurrence in other countries.—**W. Stuart.**

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